

ABSTRACT OF THE DISCLOSURE

[00133] A gasification system that includes a gasification reactor chamber having perforated conduits or an inner lining that increases the exposed surface area of waste materials to gasification conditions, thereby decreasing gasification temperature, time, and cooling period between subsequent gasification procedures. After an aspirator withdraws and oxidizes fuel gas from the gasification reactor chamber, a flare assembly combusts the mixed fuel gas to provide power or heat to at least one heat recovery device. The at least one heat recovery device recaptures thermal energy entrained in the exhaust, thereby reducing exhaust temperature and eliminating the need for an exhaust stack. An absorber purifies the exhaust and an extractor removes carbon dioxide. A portion of the removed carbon dioxide may be used for industrial purposes or for supporting vegetation. At least a portion of the remaining exhaust is returned to the gasification reactor chamber as recycled process gas, thereby completing a closed-loop system.